



United States
Environmental Protection
Agency

EPA530-R-10-011
October 2010

National Priority Chemicals Trends Report (2005-2007)

Section 4 Trends Analyses for Specific Priority Chemicals (2005-2007): Mercury and Mercury Compounds (Mercury)

Program Implementation and Information Division
Office of Resource Conservation and Recovery
U.S. Environmental Protection Agency

Contact Information:

Bill Kline, Senior Data Analyst
Information Collection & Analysis Branch
(540) 341-3631
kline.bill@epa.gov

Tammie Owen, Data Analyst
Information Collection & Analysis Branch
(703) 308-4044
owen.tammie@epa.gov

Dwane Young, Chief
Information Collection & Analysis Branch
(703) 347-8578
Young.dwane@epa.gov

Mercury and Mercury Compounds (Mercury)

Chemical Information

General Uses: Mercury is a metal used in chloralkali production, wiring devices, switching mechanisms, amalgam dental fillings, and measurement and control instruments. Industries also manufacture and process mercury reagents, catalysts, and medicinal chemicals, as well as other uses. Secondary production of mercury involves the recovery of mercury from dismantled equipment and recovery from scrap and industrial wastes using a thermal or chemical extractive process. Major sources of recycled or recovered mercury include scrap from instrument and electrical manufactures (lamps and switches), wastes and sludge from laboratories and electrolytic refining plants, mercury batteries, and dental amalgams. Mercury is also found as a trace contaminant in fossil fuels and waste materials; mercury quickly volatilizes in combustion processes.

How Much Mercury Was Generated?

For 2007, 594 facilities reported approximately 72,000 pounds of mercury being generated. One facility accounted for approximately 33 percent of the national total quantity of this PC, while 20 facilities accounted for approximately 80 percent of this PC (please refer to Exhibit 3.4 to see the number of facilities that reported this PC within various quantity ranges). Compared to the total quantities of mercury reported for 2005 and 2006, the quantity decreased by approximately 6,500 pounds and decreased by approximately 2,000 pounds, respectively (Exhibit 4.45).

Exhibit 4.45. National Generation of Mercury (2005–2007)

TRI Reporting Year	2005	2006	2007
Total Quantity of Mercury (pounds)	80,719	74,194	72,244
Number of TRI Facilities Reporting Mercury	604	610	594

Where Was Mercury Generated?

Since 2007, facilities in 52 states and territories reported generating mercury (Exhibit 4.46).

Exhibit 4.46. Location of Facilities that Generated Mercury (2007)

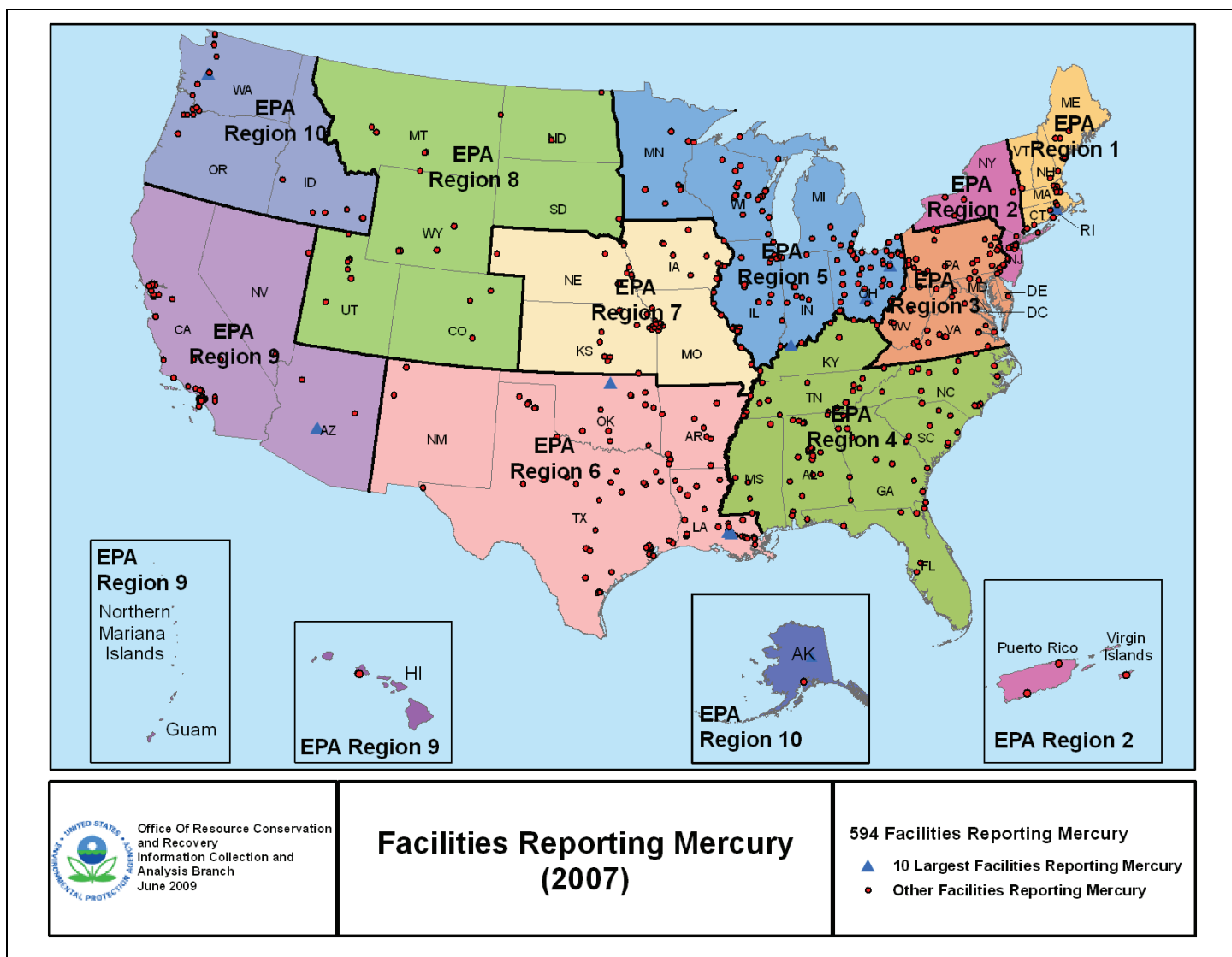


Exhibit 4.47 shows the counties in which facilities reported approximately 80 percent of the total quantity of mercury generated. Some observations concerning the quantity of mercury reported by the facilities in these counties are:

- An organic chemical manufacturing facility in New Haven County, Connecticut reported 21,405 pounds of mercury for 2006—this was the first time this facility submitted a TRI report. Prior to the 2006 TRI reporting year, the facility did not report mercury because it did not exceed the 20,000-hour full-time employee threshold for reporting to TRI. For 2007, the facility reported a decrease of approximately 17,700 pounds when the manufacturing of two products that generated mercury wastes in 2006 ceased to be manufactured in 2007.
- An alkalies and chlorine manufacturing facility in Iberville County, Louisiana reported an increase of approximately 8,600 pounds for 2006 and 14,400 pounds for 2007 due to the de-oiling of tanks from which it removed mercury contaminated mud from the bottom of the tanks.
- A U.S.DOD facility in Kern County, California reported a decrease of approximately 30,500 pounds for 2006. The mercury is a byproduct from a geothermal energy plant. The geothermal stream is passed through carbon beds to absorb the mercury. When differential pressure in a carbon bed reaches a certain point, the carbon bed is replaced with new carbon; contaminated carbon bed material (containing mercury) is disposed of. The large decrease in mercury was due to changing out all of the carbon beds in 2005; the quantity of mercury decreased because only a limited number of the carbon beds were changed in 2006 and 2007.

Exhibit 4.47. Quantity of Mercury, for Facilities Reporting 80 Percent of Total Quantity, by County (2007)

EPA Region	State	County	Quantity (pounds) of Mercury			Percent of Total Quantity (2007)
			2005	2006	2007	
6	LA	Iberville	632	9,259	23,647	32.7%
1	VT	Rutland	5,510	4,886	7,056	9.8%
6	LA	St Landry	11	0	5,219	7.2%
1	CT	New Haven	123	21,536	3,825	5.3%
3	DE	New Castle	932	3,710	3,823	5.3%
4	FL	Hamilton	2,426	2,244	2,400	3.3%
3	MD	Carroll	1,112	1,121	1,649	2.3%
6	TX	Guadalupe	1,284	1,355	1,452	2.0%
10	ID	Caribou	1,548	1,375	1,445	2.0%
4	FL	Nassau	2	0	1,420	2.0%
3	WV	Marshall	657	1,131	1,378	1.9%
6	LA	Calcasieu	983	405	854	1.2%
5	WI	Racine	360	528	648	0.9%
10	ID	Power	910	739	647	0.9%
5	OH	Trumbull	1	1	515	0.7%
9	CA	Los Angeles	599	269	446	0.6%
9	CA	Kern	31,042	568	433	0.6%
3	PA	Beaver	101	703	419	0.6%
4	TN	Bradley	260	484	406	0.6%
4	TN	Sullivan	624	424	403	0.6%
Total			49,117	50,738	58,086	80.4%

Which Industries Generated Mercury?

For 2007, facilities in 90 different NAICS codes reported mercury. Facilities in 13 NAICS codes accounted for approximately 90 percent of the total quantity of mercury generated (Exhibit 4.48).

Exhibit 4.48. Industry Sectors Quantities of Mercury, for Facilities Reporting 90 Percent of Total Quantity (2007)

Primary NAICS Code	NAICS Code Description	Facilities Reporting (2007)	Quantity (pounds) of Mercury			Percent of Total Quantity (2007)
			2005	2006	2007	
325181	Alkalies and Chlorine Manufacturing	9	4,491	15,997	30,512	42.2%
335110	Electric Lamp Bulb and Part Manufacturing	12	6,171	5,863	7,697	10.7%
324110	Petroleum Refineries	95	1,969	2,451	7,241	10.0%
325312	Phosphatic Fertilizer Manufacturing	6	5,629	4,767	4,553	6.3%
331111	Iron and Steel Mills	51	9,227	9,254	4,230	5.9%
325199	All Other Basic Organic Chemical Manufacturing	13	175	22,462	3,789	5.2%
333911	Pump and Pumping Equipment Manufacturing	2	1,112	1,121	1,649	2.3%
322110	Pulp Mills	21	236	271	1,606	2.2%
331492	Secondary Smelting, Refining, and Alloying of Nonferrous Metal (except Copper and Aluminum)	2	1,301	1,197	1,045	1.4%
325188	All Other Basic Inorganic Chemical Manufacturing	11	265	356	914	1.3%
311221	Wet Corn Milling	11	741	654	741	1.0%
327410	Lime Manufacturing	34	673	651	709	1.0%
928110	National Security	6	31,576	2,404	692	1.0%
Total		273	63,565	67,447	65,379	90.5%

How Did Facilities Manage Mercury?

Exhibit 4.49 shows how facilities, by industry, managed mercury in 2007.

Disposal: Facilities disposed of 100 percent of the mercury; approximately 90 percent was disposed of off site.

Energy Recovery: Energy recovery is not applicable to this PC.

Treatment: No facilities reported treating this PC.

In 2007, facilities also recycled approximately 837,000 pounds of mercury. See Exhibit C.3 in Appendix C for additional information about the recycling of mercury. Facilities also released approximately 18,000 pounds of mercury as air emissions and surface water discharges in 2007. See Appendix D for additional information about releases of mercury.

Exhibit 4.49. Management Methods for Mercury, by Industry (NAICS Code) in 2007

Primary NAICS Code	NAICS Code Description	Total PC Quantity Reported	Quantity (pounds) of Mercury					
			Disposal		Energy Recovery		Treatment	
			On-site	Off-site	On-site	Off-site	On-site	Off-site
325181	Alkalies and Chlorine Manufacturing	30,512	406	30,106	0	0	0	0
335110	Electric Lamp Bulb and Part Manufacturing	7,697	0	7,697	0	0	0	0
324110	Petroleum Refineries	7,241	353	6,887	0	0	0	0
325312	Phosphatic Fertilizer Manufacturing	4,553	4,553	0	0	0	0	0
331111	Iron and Steel Mills	4,230	90	4,141	0	0	0	0
325199	All Other Basic Organic Chemical Manufacturing	3,789	14	3,776	0	0	0	0
333911	Pump and Pumping Equipment Manufacturing	1,649	0	1,649	0	0	0	0
322110	Pulp Mills	1,606	119	1,488	0	0	0	0
331492	Secondary Smelting, Refining, and Alloying of Nonferrous Metal (except Copper and Aluminum)	1,045	0	1,045	0	0	0	0
325188	All Other Basic Inorganic Chemical Manufacturing	914	320	594	0	0	0	0
311221	Wet Corn Milling	741	1	740	0	0	0	0
327410	Lime Manufacturing	709	704	5	0	0	0	0
928110	National Security	692	20	672	0	0	0	0
Total		65,379	6,580	58,799	0	0	0	0

Data Derived From Hazardous Waste Biennial Reports for Mercury

In this section, we present data about mercury contained in hazardous wastes, derived from information submitted by facilities in Biennial Reports under RCRA. We derived these data by applying a methodology to estimate the quantity of mercury contained in BR waste streams. The estimates of mercury contained in hazardous wastes supplement the data reported to TRI, providing a broader perspective regarding the industries that generate and manage wastes that contain mercury. Based on applying our methodology to the 2007 BR data, we estimate that 3,108 facilities in 436 NAICS codes reported hazardous wastes containing approximately 3.7 million pounds of mercury. Facilities in three industries: NAICS code 92811 (National Security), NAICS code 325181 (Alkalies and Chlorine Manufacturing), and NAICS code 325992 (Photographic Film, Paper, Plate, and Chemical Manufacturing) accounted for approximately 65 percent of the total estimated quantity of mercury in the hazardous waste streams (Exhibit 4.50).

Exhibit 4.50. Estimated Quantity of Mercury in Primary Generation Hazardous Waste for Facilities Reporting 90 Percent of the Total Priority Chemical Quantity, by NAICS Code (2007)

Primary NAICS Code	NAICS Code Description	Number of Facilities	Quantity (pounds) of Mercury			Percent of Total Quantity
			Wastewaters	Non-Wastewaters	Total Quantity	
928110	National Security	180	187	1,271,325	1,271,512	34.5%
325181	Alkalies and Chlorine Manufacturing	15	383,364	305,935	689,298	18.7%
325992	Photographic Film, Paper, Plate, and Chemical Manufacturing	8	1	430,086	430,087	11.7%
336611	Ship Building and Repairing	19	2	195,859	195,860	5.3%
324110	Petroleum Refineries	76	9	126,011	126,020	3.4%
325199	All Other Basic Organic Chemical Manufacturing	99	17,365	106,696	124,061	3.4%
339950	Sign Manufacturing	4	<1	96,757	96,757	2.6%
331111	Iron and Steel Mills	30	<1	72,806	72,806	2.0%
325320	Pesticide and Other Agricultural Chemical Manufacturing	17	<1	54,509	54,510	1.5%
325311	Nitrogenous Fertilizer Manufacturing	3	<1	51,552	51,552	1.4%
335110	Electric Lamp Bulb and Part Manufacturing	15	18	36,739	36,757	1.0%
325412	Pharmaceutical Preparation Manufacturing	141	198	33,709	33,907	0.9%
611310	Colleges, Universities, and Professional Schools	233	56	33,636	33,692	0.9%
325211	Plastics Material and Resin Manufacturing	80	3	32,166	32,169	0.9%
325110	Petrochemical Manufacturing	17	<1	21,997	21,998	0.6%
325414	Biological Product (except Diagnostic) Manufacturing	28	99	21,850	21,949	0.6%
325192	Cyclic Crude and Intermediate Manufacturing	15	<1	20,546	20,546	0.6%
Total		980	401,302	2,912,179	3,313,481	90.0%

In 2007, facilities generated hazardous waste containing mercury in more than 900 counties within 55 states and territories. Exhibit 4.51 shows the 35 counties in which facilities generated an estimated 90 percent of the mercury contained in hazardous wastes.

Exhibit 4.51. Counties in Which Facilities Generated 90 Percent of Lead Contained in Primary Generation Hazardous Waste (2007)

EPA Region	State	County	Estimated Quantity of Mercury Contained in Hazardous Wastes (pounds)	Percent of Total Quantity of Mercury Contained in Hazardous Wastes
4	AL	Calhoun	1,252,423	34.0%
2	NY	Monroe	430,344	11.7%
4	TN	Bradley	209,172	5.7%
4	AL	Colbert	162,974	4.4%
6	LA	Calcasieu	157,191	4.3%
3	VA	Portsmouth City	133,110	3.6%
9	CA	San Diego	103,460	2.8%
5	WI	Wood	80,263	2.2%
6	TX	Harris	75,079	2.0%
4	KY	Boyd	74,276	2.0%
7	MO	Jackson	73,517	2.0%
3	DE	New Castle	65,211	1.8%
4	AL	Mobile	59,642	1.6%
3	VA	Radford City	51,542	1.4%
6	LA	Iberville	38,873	1.1%
6	TX	Galveston	31,211	0.8%
7	MO	St Louis City	30,436	0.8%
5	OH	Pickaway	26,551	0.7%
6	TX	Ector	22,209	0.6%
5	MI	Wayne	20,183	0.5%
3	VA	Henry	20,031	0.5%
6	TX	Nueces	19,376	0.5%
9	AZ	Gila	18,810	0.5%
5	OH	Ashtabula	18,300	0.5%
6	LA	St Landry	17,549	0.5%
4	GA	Richmond	17,092	0.5%
10	WA	Cowlitz	16,775	0.5%
3	PA	Lawrence	16,652	0.5%
9	CA	Alameda	14,165	0.4%
5	WI	Racine	14,134	0.4%
5	IN	Lake	13,544	0.4%
7	MO	St Louis	12,778	0.3%
3	PA	Allegheny	9,476	0.3%
2	NJ	Bergen	8,606	0.2%
Total			3,314,954	90.0%

Exhibit 4.52 shows how facilities reported managing hazardous wastes that contain mercury. For example, facilities incinerated hazardous wastes containing an estimated 931,000 pounds of mercury while hazardous wastes containing an estimated 239,000 pounds of mercury were sent to metal recovery. See Appendix E for a full list of the BR management codes and their descriptions.

Exhibit 4.52. Methods Used to Manage Hazardous Wastes Containing Mercury (2007)

Management Method Group	Management Method Code Description	Quantity of Mercury Managed (2007)	Percent of Total Estimated Quantity of Mercury
Destruction or Treatment Prior to Disposal at Another Site	Incineration	930,773	25.0%
	Other chemical precipitation with or without pre-treatment	237,263	6.4%
	Stabilization or chemical fixation prior to disposal at another site	211,123	5.7%
	Other treatment	149,711	4.0%
	Macro-encapsulation prior to disposal at another site	46,325	1.2%
	Sludge treatment and/or dewatering	327	<0.1%
	Chemical oxidation	265	<0.1%
	Chemical reduction with or without precipitation	102	<0.1%
	Biological treatment with or without precipitation	95	<0.1%
	Neutralization only	33	<0.1%
	Evaporation	33	<0.1%
	Phase separation	4	<0.1%
	Wet air oxidation	1	<0.1%
	Adsorption	<1	<0.1%
Destruction or Treatment Prior to Disposal at Another Site Total		1,576,054	42.4%
NA	NA	1,070,899	28.8%
NA Total		1,070,899	28.8%
Reclamation and Recovery	Metals recovery	239,266	6.4%
	Energy recovery at this site	120,526	3.2%
	Fuel blending prior to energy recovery at another site	115,904	3.1%
	Other recovery or reclamation for reuse	39,366	1.1%
	Solvents recovery	872	<0.1%
Reclamation and Recovery Total		515,933	13.9%
Disposal	Landfill or surface impoundment that will be closed as landfill	229,999	6.2%
	Deepwell or underground injection	18,359	0.5%
	Land treatment or application	3,780	0.1%
	Discharge to sewer/POTW or NPDES	2	<0.1%
Disposal Total		57,077,921	16.5%
Transfer Off Site	Storage, bulking, and/or transfer off site	301,493	8.1%
Transfer Off Site Total		301,493	8.1%
Grand Total		3,716,520	100.0%